

The Broadband Internet?

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Achieving Connectivity

Our problem isn't the lack of capacity – it's our inability to achieve simple connectivity. We have abundant capacity but can't use it because we have gatekeepers who set a price on our ability to communicate and innovate.

If we were able to take advantage of what we already have we would find ourselves with a wealth of opportunities rather than having to pay billions to “stimulate” the gatekeepers into letting us create new value.

Introduction

I'm troubled by all the emphasis on “broadband” because the word is too ambiguous to represent a real consensus and understanding. To many it's more “Internet” but it's also a business model that takes 90 to 99% of the capacity off the table for the providers' own use.

We must start by understanding that achievement of the Internet is to make it easy to create solutions without having to negotiate with every entity along the path.

Internet connectivity should “just work” from wherever we are. Today we expect to find roads and running water everywhere, at least within the US and increasingly throughout the world.

In the same way we should be able to assume that we can simply be connected wherever we are without having to think about it and without making deals simply to communicate.

I have a challenge because I need to explain the technology of the Internet to show how it can work without providers. But I also need to explain policy to technologists to recognize that the technical choices are driven by the funding model.

This not just about the Internet as such – it's about how we use technology – the difficulty in finding the right remote control for each device and getting it setup is the same problem!

The priority should be making it simple to make connections (relationships) between devices and other end points. Instead we spend all our time trying to navigating dark twisting passages and feeling frustrated by how much time and effort we waste and how little we accomplish.

Imagine

Imagine if you could simply buy a device, turn it on and it just connected to the world. That's all. You didn't have to worry about getting the right services, you didn't have to worry about where you were, and you didn't have to even find a wire.

This isn't just about the Web but our basic everyday lives and our safety. Why can't a fire alarm just report fires directly (with some allowance for false alarms)? Why can't you choose a medical alert device that is always connected to those can help you?

There is no reason this can't happen. It's the simplicity I aimed for when I first started thinking about home networking and the only impediments are our current policies and current protocols.

What is holding us back is a profound failure of imagination. We are rightfully suspicious of fantastic claims but the Internet is very mundane and very simple. It's about taking advantage of opportunities and, in implementation, the ability to exchange bits between two points very simply and inexpensively. What we do with it is up to us but it is vital that we all have the opportunity to do so ourselves.

And we can once we know to demand simple connectivity rather than expensive packaged services.

Technically the Internet has demonstrated the power of the idea – what we need to do is get past the legacy of century

old analog communications in which we needed a special infrastructure for each purpose.

Today's maze of telecom "tubes" that are primarily about billable events rather than providing opportunity. We could do far better to treat all bits as interchangeable and thus create a vast "bit commons".

The Problem in a Word

It's useful to recall the famous "[if by whiskey](#)" speech:

"If when you say whiskey you mean the devil's brew... then I'm against it. But, if when you say whiskey you mean the oil of conversation ... then certainly I am for it"

People keep asking for more "broadband" when they want more "Internet". When I ask them to try to phrase it without the word they are often unable to because they have used the word in lieu of understanding.

If by the word they mean connectivity – the ability to make simple connections between two points then I'm all for it. If by the word they mean a business model funded by forcing us to buy services rather than creating our own solutions then I'm against it.

Today we are used to the "broadband" Internet in which we achieve connectivity despite the services and twisting passages our connections travel. I want to give a sense of the simplicity we should expect and how to achieve at.

But I also need to dig deeper into the business model that we associated with telecom and highlight the dangers of complacently accepting it as a means of achieving connectivity.

Achieving Connectivity

How do we achieve connectivity? The good news is that it's hard to prevent once we have protocols that facilitate the exchange of bits. Today's Internet protocols are a prototype but we need to do more by separating the end-to-end relationships from the paths we use to make connections.

In today's implementation the IP address services both as the path identifier and the end point identifier which was expedient in the 1970's but that approach doesn't scale.

We had to invent the DNS to manage the housekeeping and then confused it with a directory.

We need to look at the problem afresh – we need [advocacy](#) that is not framed in term of today's telecom industry. This is the danger in using the term "broadband" because it implicitly assumes today's telecom model.

The high order bit is the funding model – as long as we continue to frame the debate in terms of services and services providers (especially if that service is "broadband") then we will get, at best, incremental change and, at worst, we will continue to be denied the benefits of the low incremental cost of connectivity. Or, if you want lingo, we'll deny ourselves the benefits of [OPEX and low CAPEX](#).

I want to take a positive approach that delivers real benefit to the economy by creating opportunity and frees us from paying hundreds of billions of dollars in charges for billable events that add no value. It also saves us billions of dollars in spending on new infrastructure even as our current infrastructure lies essentially fallow.

It's a very positive message that seems to get lost in the noise about broadband and intermediate issues like network neutrality. Perhaps it's difficult to see this as a simple issue because we expect complex problems to require grand solutions. But I argue the issue is simple:

- Service funding means capacity goes to services and is not shared.
- Physical infrastructure funding maximizes our ability to create our own services.
- We need to create opportunity rather than just solutions to what we already understand.

I do worry about our focus on the "broadband gap" as a rallying point. If we factor out cable TV what is the problem with "connectivity" even at modest speeds? While there are many people without abundant capacity at their homes and even offices I see a far greater problem in the inability to connect at all when away from homes and offices without expensive special arrangements such as a separate cellular plan for each device in each location. This is a global problem – data plans rarely have roaming arrangements and the costs go up by orders of magnitude due to the vicissitudes of billing arrangements.

Focusing purely on “broadband” is akin to looking for your lost key under the lamppost because that’s where the light is rather than where you actually dropped the key.

Closing the broadband “gap” doesn’t address the real issue and the real lesson of the Internet. It’s not about the network – it’s about how we use the facilities available. It’s about our ability to create applications outside the network without having the network itself having to change to accommodate new ideas.

Broadband is about making the network work better for the applications we already have. It doesn’t just fail to provide use with opportunity but creates a dependency on the choices of the network operator. It means we can do same-old faster and better.

This is the tragedy – not only are we denied the ability to discover what is possible, we become “bubble babies” dependent upon the network providers’ choices and their pricing and unable to care for ourselves.

A Viable Approach

The technical details of connectivity are startlingly simple once you understand how “digital” simplifies connectivity. We can create our own solutions once we can exchange bits. We can easily emulate traditional telecom using the abundance of bits but without the billable events. Hence the need for transparent funding of infrastructure.

But it’s not about spending as much as saving money because we already have lots of wires and fibers and radios. But we’ve divided them into isolated regions. Digital technology means all bits are the same – imagine if we could look at all the capacity as one big pile of bits – a vast commons.

We use this bit commons as a shared medium instead of paying for someone to convert the bits to phone calls, police systems and traffic systems. We wouldn’t pay a premium for bits based on how we choose to use them. This is why email is free – we invented it outside telecom.

If we decide we need new infrastructure (more capacity) then we’d pay for it because we’d understand it and the cost, as infrastructure is [low](#). It’s the service funding model that keeps the costs high.

Today’s Internet protocols provide use with a strong starting point – the protocols can be used to exchange packets across communities without relying on a central authority.

It’s important to recognize that we are not starting from scratch – we can use our existing infrastructure as-is and move forward from there by changing the funding model.

Change seems difficult because the incumbents resist change. Or so it seems. They face a troubled future as I will explain below. The bigger problem is that we are focused on fixing the problems of telecom rather than on finding a common future.

By decoupling the physical facilities from the services we create sustainable self-regulating markets (or, if you prefer, business models).

We already have companies that install and maintain facilities. It’s just that many of them exist only as departments within existing companies and often find themselves in conflict with the larger culture. Independents have to exist within the ecosystem defined by the incumbents. There would be a vast competitive market in supporting the physical facilities. Not only are there many thousands of local communities we also have homes and business that need services.

For example Level 3 was created to build good stuff cheap. It now finds itself unable to capitalize on its strength because it has to make money by selling services. Providing too much capacity would cause the price of services to drop.

We have many companies that are vying to provide “content” and services. Today the popular content is controlled by the providers (as “cable”) and those who want to go directly to the customer find themselves competing with the providers. This leads to inevitable concerns about fairness.

The reason these business models are often dismissed is that they don’t fit in the current service framing. I’ve compared it with trying to explain the business model for roads to a railroad executive. Today we have companies used to high margins and the ability to control the market. They may not be able to adapt to this change. Content providers may face serious challenges when there is so much available.

Remember that the FCC was created to assure an orderly marketplace for telecom services. Now that we have an

alternative we no longer need to accept the limitations that come from trying to sustain today's telecom market.

The Past Redux – Incenting What?

I realize that those advocating more broadband are doing so with the best of intentions but the problem is in the framing not the implementation. The criticisms of the current practices are valid:

- The incumbents have made many promises that they haven't kept. *But the promises cannot be kept for structural reasons. We are the ones who let ourselves be fooled.*
- We do want connectivity and high-speed is needed. *But we will only get high-speed if we don't allow ourselves to accept dependency upon the providers.*
- We need funding for new infrastructure and need to redirect the USF funding. *But where is the effort to take advantage of what we already have but don't use to capacity?*

Before we demand more of the same shouldn't we try for a deeper understanding than us vs them and question the premises rather than accepting the "obvious" framing we've inherited?

If we want more "Internet" we need to understand the dynamic that has driven it and recognize the opportunity before us. The first step is to start fresh with connectivity as the defining principle.

It's no surprise that insider (or *nearsider*) experts tend to accept the conventional wisdom. After all why work for a carrier if you don't believe in their business model? And if you don't, why put your career in jeopardy? I'm willing to believe that the Verizon employees who speak of the wonders of shiny glass at franchise hearings spoke out of personal conviction. The same is true of some members of the FCC's TAC whose expertise is framed in their deep experience.

This is reinforced by studies which may be entirely correct given their premises – the problem is in the premises. We also must look beyond the stated conclusion to understand the implications (or end-game).

I realize I've made these points in the past but I find that there's a tendency to dismiss them rather than responding. I'm not an idealist – just being pragmatic when I find the existing efforts counter-productive or naïve.

Why pursue a model that is not [viable](#)? This is why I cite the industry's own [fear of abundance](#). Even I was surprised when I compared telecom to [railroads](#) and then found that the [FCC](#) was modeled on the [ICC](#). And the process continues as David Pogue noted recently in the NY Times – you no longer need a cable box for most "content" (AKA television).

Once you become aware you start seeing failures of the model all over the place. Nortel bet on the wrong silo but then how different is Nortel from Lucent and others who depend on selling high priced gear to large providers?

Why must the industry work so hard to prevent customers from aggregating their usage by running a special carrier-provided wire to each apartment?

Why are investors risking their money? After all, if the business model is not viable are people putting billions into a system that is not sustainable? Or is due diligence viewed as unnecessary if you believe hard enough? The lack of attention to detail is coming due with a vengeance. Telecom is no exception.

Again it's the funding model. If local ownership is still framed in services then we haven't escaped the problem of telecom viability. The question is not whether a city owns its infrastructure – it's whether we are able to use it without being limited to billable services. I use the term "muni-bell" for these local operating companies because they are modeled on the traditional carriers – the Bells.

If it's about job creation and economic opportunity we must let the value escape from telecom into the infrastructure. As Bruce Kushnick and others have noted we've already paid for the existing infrastructure but we don't get the benefits of the very low cost of actually using what we own. And we repeat the process by funding new infrastructure the same old way. Incenting incumbents doesn't give us ownership and a debt that has been paid off.

We ignore the US Constitution and antitrust principles. Why do we accept the presumption of scarcity and cede control of our means of communicating and our own infrastructure? Why do we accept silos and a lack of choice? Isn't it obvious that if voice bits can travel any path then video can too and the defining premise of the franchise system no longer makes sense?

If we're talking basic economics then isn't there something very strange about funding multiple identical infra-

structures? After all we can't sustain competing power distribution systems. Electricity is distributed and consumed whereas with the Internet we are sharing among ourselves. Containing bits within each system actually creates barriers and defeats the very purpose of sharing. At least the forests of cell towers are getting some attention. There are calls to share the towers to avoid expensive and unnecessary duplication. But if we understand enough to demand some sharing why not follow the idea to its conclusion and have a bit commons? It is indeed a slippery slope but that's the marketplace in action -- sometimes the extreme case is actually the most reasonable and sustainable.

If we care about health care and safety then why do we accept a solution that provides connectivity only where we pay for jacking in? We don't even have an E911 solution that allows us to tap into IP connectivity via access points. The reason is simple -- you can't pry open connectivity just a little so you must ban it in the telecom framing.

By creating special "responder" and other networks we fail to learn the importance of having a common infrastructure. It gets even weirder when we try to make a provider network self-funded in competition with the rest of connectivity (AKA, the Internet). It's as if **none of the lessons of our financial** debacle, let alone the Internet have been learned. There is no relationship between the two markets so why tie them together in a dysfunctional dance?

Coverage is more important than speed. Of course people want their television but this is no different from VoIP in the 1980's. And just as we had a perfectly functioning voice network, today we have a cable network. Sure, they are expensive compared with IP but raising the cost of connectivity to compete with them seems to lose sight of why the disparity exists. Speed is easy -- we'll get it just as we got VoIP to work.

Why are speed and more TV the priorities over being connected at all? It's "24x7" connectivity that transformed the society not speed and especially not billable speed. This focus on speed ignored all the lessons of history and the fact that modems not ISDN got us to where we are.

Without connectivity we don't get health care and we don't get coverage in an emergency. We may be bored without TV but we can't tolerate being disconnected in other aspects of our lives.

Cellular is not the answer because it's fragile and expensive and closed -- we can't extend the coverage. My T-Mobile phone even refuses to connect if it sees an ATT towers in an area without the carriers having a billing arrangement. In fact the cell carriers are now extending their coverage with customer owned access points -- an admission that their model is secondary to IP connectivity.

We are going backwards as carriers attempt to [recapture](#) our home networks! We see hints of this in FiOS where Verizon builds on the legacy of "cable" and requires coax for their video even if their VoD runs fine over Ethernet. We see efforts from the ITU and [ATIS](#) to return to the time when each signal had its own wires maintained by a provider. It's easy to fall into such dependency if there is no constraint because in the short term it works even if in the long term we are trapped in that short term.

The ATIS effort could be purely about networking but their press release clearly comingles application requirements with the network thus undermining the separation of application (TCP, UDP) from transport (IP). This is personal since I was careful to avoid this very dependency when I did home networking at Microsoft.

If we want jobs we should understand that the Internet's architecture is designed to allow for a wealth of new ideas and opportunities whereas just fattening today's pipes may add some opportunity but makes it difficult to do what has not been anticipated. Remember that traditional telecom was all about reliable services. The basic Internet protocol allowed for taking advantage of unreliable delivery to create streaming services without depending upon providers.

Requiring fat pipes increases our dependency and makes it difficult to shift the design points. We should be able to take advantage of high capacity paths as an opportunity but we need a plan B for when those fat pipes aren't available. Fortunately many of our vital services do not need high speed, but they do need coverage and availability.

The focus on "high-speed broadband" comes at the price of neglecting to assure coverage for these vital services. We haven't learned the lessons of ILECs vs CLECs. By depending on content providers to provide connectivity we have the very same dynamic. The hyper-growth we are used to depends on incentives being aligned. A carrier has little incentive to make their competitors (us

– the empowered users) more capable competing with them for services.

If you believe in markets then there should be some way for users to buy what they need directly instead of trying to fund vital infrastructure through the sale of services. It's one thing to charge for a "free" show by requiring customers buy drinks – it's another thing to require that we make phone calls to pay for E911.

But it's not just about networking. We should be at least start to understand how to solve problems [using networks](#). Even if all the broadband deployment happens we are still bereft of any ability to take advantage of the opportunities in terms of application protocols. We're still thinking in terms of wired logic. Smart meters have no one to "talk" to other than the power companies whose only approach seems to be to reach into my house and turn down my appliances! It's right out of the 1950's or before!

If we were able to use our own software to control our homes (and other buildings) then we'd be partners working with the power companies and able to explore creative solutions.

Epilog

Today people know that they want more "Internet" so they ask for more of the same by saying "broadband". Our future lies in universal connectivity and simplicity. We can do better than living in the past glory of telecommunications.

Change happens when there is a new consensus.